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Research Notes : Performance of F1 generation of soybean in relation to Colaspis sp. and Diabrotica speciosa

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Table 1

Relative root and top dry weight and root length of nine soybean cultivars

Maturity Group	Cultivars	Relative dry weight		Relative root length[1]
		Root	Top	
VII	Ransom	0.73	0.78	0.65
V	Centennial	1.00	0.97	0.89
V	Essex	0.73	0.98	0.84
V	Forrest	0.75	0.78	0.67
V	Hill	1.04	1.04	0.32
V	York	0.96	0.98	0.96
VI	Lee	1.04	0.89	1.43
IV	Perry	1.20	1.12	1.30
IV	Chief	0.70	0.83	0.50

[1]Data from nutrient solution study.

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1) Oviposition of Bemisia tabaci (Genn.) in F_1 soybean plants of crosses between PI 229,358 and commercial varieties.*

The whitefly Bemisia tabaci is an important vector of virus diseases of cotton, soybean, bean, tomato and other crops. Soybean is a good host for this insect and the increase in the soybean acreage in Brazil has brought an uprise in the whitefly population and whitefly-transmitted viruses.

The introduction of resistance against this whitefly in soybean commercial varieties may benefit many crops in Brazil.

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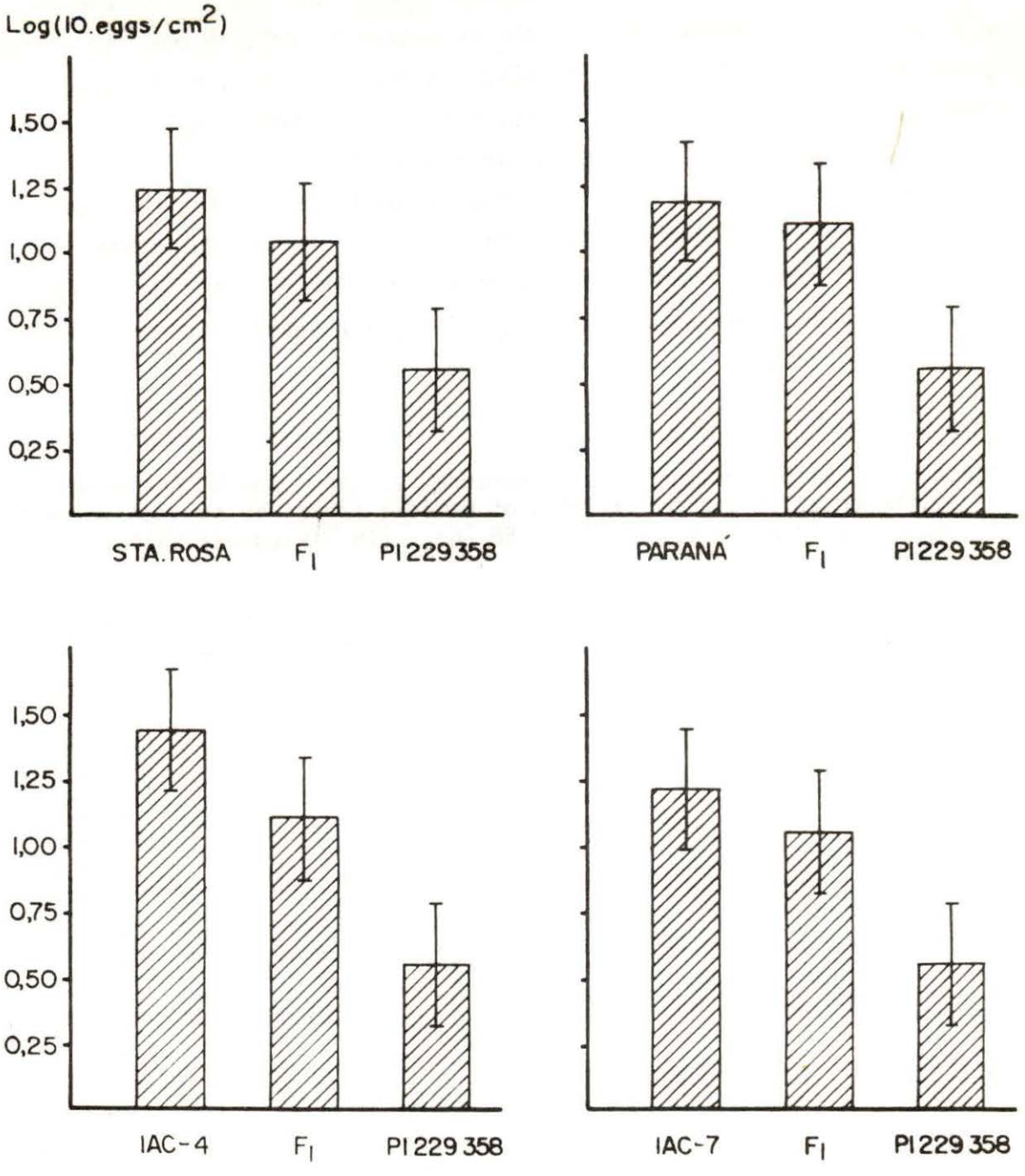

L.S.D. (Tukey 5%) = 0,460

C. V. = 24,00 %

Fig. 1 Average oviposition of Bemisia tabaci on leaves of different soybean cultivars, the PI 229358 and their F_1.

The preference for oviposition of B. tabaci was studied in the parents and F_1 plants from crosses between the resistant PI 229,358 and the varieties 'Santa Rosa', 'Parana', IAC-4 and IAC-7. A free-choice type of experiment was conducted under greenhouse conditions, utilizing potted plants distributed in randomized blocks with 9 treatments and 7 replications.

Four days after artificial infestation with the adults, the number of eggs per cm^2 of leaves was estimated in samples of two trifoliolates per plant.

Figure 1 summarizes the results obtained. The PI 229,358, commercial varieties, and F_1 plants received respectively the least, the most and intermediate number of eggs.

Reference

Rossetto, D., A. S. Costa, M. A. C. Miranda, V. Nagai and E. Abramides. 1977. Differences in the oviposition of Bemisia tabaci in soybean varieties. An. Soc. Entomol. Bras. 6(2): 256-263. (In Portuguese with English summary).

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2) Performance of F_1 generation of soybean in relation to Colaspis sp. and Diabrotica speciosa.

Resistance against the leaf beetles Colaspis sp. (C. occidentalis or near occidentalis according to Dr. R. White, Insect Identification and Beneficial Insect Introduction Institute, Beltsville, MD, USA) and Diabrotica speciosa (Germar, 1824) were evaluated under greenhouse conditions, utilizing the resistant PI 227,687, two commercial susceptible varieties 'Santa Rosa' and 'Parana', and the two F_1 between the PI and these commercial varieties.

A free-choice type of test, with five replications, and artificial infestation of field-collected adults, was made and the percentage of leaf area eaten was visually estimated.

Tables 1 and 2 show the percentage of leaf area eaten by C. occidentalis and D. speciosa. The first species, C. occidentalis, showed preference to feed on old leaves over young leaves.

The F_1 generation performed as the resistant parent in relation to both species of beetles, which suggests a dominant type of resistance. This does not mean, however, that the same genetic factor is responsible for these resistances.

The number of petioles cut by D. speciosa (Table 2) is correlated positively with the percentage of leaf area eaten by this species.

Table 1
Percentage of leaf area eaten by Colaspis sp. in young and old leaves of soybean of different varieties

Treatment	% of leaf area eaten by adults*		
	Young leaves	Old leaves	Total
Parana	20,93 a	43,68 a	39,31 a
Santa Rosa	28,26 a	36,78 a	31,45 a
F_1 (S. Rosa x PI 227,687)	10,64 b	22,43 b	16,05 b
PI 227,687	11,32 b	18,55 b	13,62 b
F_1 (Parana x PI 227,687)	8,43 b	15,12 b	11,54 b
C.V. (%)	27,30	29,40	28,80

*Means followed by the same letter do not differ significantly by the Tukey test at 5% level.

Table 2

Percentage of leaf area eaten and number of petioles cut by Diabrotica speciosa in soybean varieties

Treatment	Percentage of leaf area damaged*	Number of petioles cut*
Parana	52,83 a	1,44 a
Santa Rosa	52,25 a	1,46 a
F_1 (Santa Rosa x PI 227,687)	10,52 b	0,91 b
F_1 (Parana x PI 227,687)	6,00 b	0,71 b
PI 227,687	5,01 b	0,71 b
C.V. (%)	23,20	23,50

*Means followed by the same letter do not differ significantly by the Tukey test at the 5% level.

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1) Flavonol classes of cultivars in Maturity Groups 00-IV.

Since the complementary action of Fg_1 and Fg_3 in producing kaempferol 2^G-glucosyl-gentiobioside (Buttery and Buzzell, 1975) is associated with deleterious effects on chlorophyll concentration, photosynthetic rate and yield (Buttery and Buzzell, 1976), the bringing together of these two genes in crosses may necessitate selection against the Fg_1-Fg_3-genotype in the segregating material. For example, with the cross of 'Corsoy' (Fg_1 fg_3) x 'Hawkeye' (fg_1 Fg_3) at Iowa State University, visual selection was carried out against "chlorophyll deficient" types during inbreeding in order to develop lines for a physiological study. At the time of selection it was not known that flavonol-glycoside genes were involved. Advanced lines were later classified using thin layer chromatography (Buttery and Buzzell, 1973). The distribution